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Health-related quality of life in outpatient women with COPD in daily practice: The *MUVICE* Spanish Study☆

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Summary
Aims: A cross-sectional multicenter study was designed to assess health-related quality of life (HRQL) in women with chronic obstructive pulmonary disease (COPD) who were attended in the outpatient setting in actual conditions of the daily practice.
Methods: A total of 1786 women with COPD (mean age of 66.5 years) and 1661 pairs of men and women matched by age and COPD severity participated in a cross-sectional study. HRQL was measured with the Short Form 12 Health Survey Questionnaire (SF-12).
Results: The mean PCS-12 and MCS-12 scores were 36.5 ± 10.3 and 44.1 ± 11.8, respectively. General health and physical functioning domains were those with the lowest scores, whereas role emotional and social functioning were those with the highest scores. The percentage of women with low HRQL increased according to age, whereas the percentage of women with high or normal HRQL decreased significantly. In relation to COPD severity, more women rated HRQL as low in the physical component than in the mental component. HRQL correlated significantly with FEV_1 in both PCS-12 and MCS-12 scales. As expected, an inverse significant correlation between HRQL and degree of dyspnea in the PCS-12 and the MCS-12 scales was observed. Women had also a significantly worse HRQL than men in all physical and mental domains.
Conclusions: In outpatient women with COPD, HRQL was impaired especially the physical component of the SF-12. For the same age and severity of COPD, women showed significantly lower scores in all physical and mental domains of the SF-12 than men.

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Introduction

Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality and represents a substantial economic and social burden throughout the world.[1,2] Smoking is the most common cause of COPD. From a historical perspective, COPD has been considered to occur more frequently in men than in women, which has been largely attributed to the differences in smoking rates.[3,4] In recent years, however, COPD has become an increasing problem among women. In the United States, the absolute numbers of COPD cases, hospitalizations, and deaths among women have surpassed the number of men,[5] and similar trends have been observed in other Western countries.[6–8] This has occurred despite evidence of gender bias in the diagnosis of COPD.[9,10]

The increasing prevalence of COPD among women is thought to be related to the secular trends in smoking habits,[11] although some authors have suggested that women may be more susceptible to the damaging effects of tobacco than men.[12–14] The concept of differential susceptibility remains controversial,[15] but it is becoming clear that there are important differences between men and women in the development, progression, and outcomes of COPD.[16–19] Moreover, the physiologic changes of COPD affect women and men differently in terms of symptoms and quality of life. Women with COPD also demonstrate higher levels of anxiety and depression than their male counterparts.[20,21]

Health-related quality of life (HRQL) has received an increasing interest over the past decade as an important measurable outcome in patients with COPD. An impaired health status is an important determinant to predict mortality,[22] exacerbations and hospital admissions,[23] and response to different treatment options.[24] Previous studies using both generic and disease-specific instruments for measuring HRQL in COPD patients[25] have shown relationships between HRQL and disease severity, respiratory symptoms, gender, comorbidity, body weight, upper airway symptoms and psychological status.[26–31] In a recent study carried out in Spain, determinants of HRQL in patients with COPD who were followed in primary care included sex, forced expiratory volume in 1 s (FEV_1), use of oxygen therapy, and number of visits to emergency rooms and hospital admissions.[32] However, there are only a few studies on HRQL in female populations with COPD.[18] In a case series of 53 FEV_1-matched men and women with COPD, de Torres et al.[17] found that women had worse scores in the Saint George's Respiratory Questionnaire (SGRQ) than men at younger age and earlier stage of the disease.[17] In a separate series of 146 FEV_1-matched men and women with COPD, the same authors, reported that, compared with men, women also had worse scores in all domains of the SGRQ. Thus for a similar degree of physiological impairment, women experienced more severe dyspnea and worse health status.[33] Furthermore, the factors that determine HRQL for men and women with COPD may differ by gender.

To further contribute to the characterization of HRQL in female patients with COPD, a multicenter cross-sectional study was designed, the primary objectives of which were to assess HRQL in a large sample of women with COPD who were attended in the outpatient setting in actual conditions of the daily practice, and to examine differences in HRQL between men and women matched by age and severity of COPD.

Materials and methods

Patient population

We conducted a 2-month cross-sectional survey of the first five consecutive patients with COPD who were visited by general practitioners in primary care centers and by pneumologists in the outpatient clinics of the Services of Pneumology of acute-care hospitals from all over the country in Spain. A sample of 2300 general practitioners and 200 pneumologists were recruited using a stratified random sample drawn from the list of registered physicians in all autonomous communities.

Patients of both the sexes, aged 40 years or older, with a previous diagnosis of COPD (confirmed by history and spirometry) were eligible provided the reason of consultation was related to his/her pulmonary condition. The diagnosis of the disease was performed according to the criteria of the Spanish Society of Pneumology and Chest Surgery (SEPAR) based on the demonstration, through a forced spirometry, of an FEV_1 below 80% of the reference value and an FEV_1/forced vital capacity (FVC) ratio below 0.7 after the bronchodilation test. The severity of COPD was rated at three levels according to the FEV_1 value: mild (FEV_1 60–80% of the reference value), moderate (FEV_1 40–59% of the reference value) and severe ($FEV_1 < 40\%$ of the reference value) following SEPAR criteria,[34] which are based on the guidelines of the British Thoracic Society.[35] Spirometric measurements at the time of the study were not performed. Patients with an acute worsening of their COPD in the previous month were excluded as were those suffering from any physical and/or psychiatric disease precluding to complete the HRQL questionnaire. Patients with more than 80% of missing data for the study variables in their medical records were also excluded.

For the purpose of the present study, the *MUVICE* Study (Spanish acronym of *Women Living with Chronic Obstructive Pulmonary Disease*), the cohort of women was selected, as well as an equal number of men with COPD matched by age and severity of COPD measured by FEV_1. The main objectives of the study were to assess HRQL in the *MUVICE* cohort and to determine differences in HRQL between men and women matched by age and severity of COPD as measured by the FEV_1. Secondary objectives included to assess the correlation between HRQL and FEV_1 and dyspnea in women, to gather information on the treatment of COPD in women, and to assess gender-related differences in health resources utilization.

The study protocol was approved by the Ethics Committee of hospital Gregorio Marañón, Madrid (Spain), and written informed consent was obtained from all the participants.

Procedures and data collection

Interviews were carried out by the participating physician in the course of the patient's consultation in routine daily

practice. All data were collected in a single visit using a questionnaire in which the following variables were recorded: age; sex; height; weight; smoking habit (current smoker, never smoker, ex-smoker); year of COPD diagnosis; data of the last spirometric measurement and FEV_1 and FEV_1/FVC values; severity of COPD; current COPD therapy including non-pharmacological management (smoking cessation counseling, stop smoking treatment, oxygen therapy, rehabilitation, others) and pharmacological treatment (short-acting β_2 agonists, long-acting β_2 agonists, short-acting anticholinergics, long-acting anticholinergics, inhaled steroids, oral steroids, a fixed combination of anticholinergics and short-acting β_2 agonists, a fixed combination of long-acting β_2 agonists and inhaled steroids, antibiotics, others); disability; and health resources utilization in the previous 12 months (number of outpatient visits to either the primary care physician or the pneumologist, emergency department visits, hospitalizations, and days on sick leave).

Disability was classified according to the Medical Research Council (MRC) dyspnea scale.[36] The MRC dyspnea scale concerns perceived breathlessness and consists of five degrees: 1, ''shortness of breath with strenuous exercise''; 2, ''shortness of breath when hurrying''; 3, ''walking slower than people of the same age on the level ground or stop for breath while walking at own pace on the level ground''; 4, ''needing to stop after 100 yards on the level ground''; 5, ''too breathless to leave the house''. A Spanish translation of MRC dyspnea scale was administered to the subjects.[37]

Health-related quality of life

All patients were administered the Short Form 12 Health Survey Questionnaire (SF-12), an abbreviated version of the SF-36 health questionnaire that contains 12 items.[38] These 12 items explain more than 90% of the variance of the physical and mental component scales of the SF-36. From them two scores can be calculated, the physical (PCS-12) component summary and the mental (MCS-12) component summary, using a value of 50 with a standard deviation of 10 as reference population. In this study, the general Spanish adult population has been used as a reference.[39,40] Scores range from 0 to 100, with higher scores representing better HRQL. A score >60 has been regarded as high HRQL, 40—60 as normal HRQL, and <40 as impaired (low) HRQL. A translated version of the questionnaire validated for Spain has been used.[41]

Statistical analysis

In order to detect a clinically relevant difference of 5 points in the mean PCS-12 and MCS-12 scores among the subgroups of men and women stratified by the three severity levels of COPD with a statistical power of 95% and a level of statistical significance (alpha) of 0.05, using a two-tailed Student's *t*-test for the comparison of two groups (considering a standard deviation of 12 for the mean SF-12 scores of each group), a total number of patients required in each stratum was 165. According to the data of the IBERPOC Study,[42,43] women showed the lowest prevalence of COPD (22%) with a subset of women with severe disease accounting for 1.653% of the total number of patients with COPD. Therefore, the total number of patients required was 9981 (165/0.01653). This number was increased to 12,477 assuming a percentage of losses of 20% due to non-evaluable cases.

Of the total number of COPD patients of both the sexes recruited, the subset of women with COPD was selected for the study. Women were distributed into 15 subgroups as follows: for each severity level of COPD (mild, moderate, severe), patients corresponding to five age strata (40—49 years, 50—59 years, 60—69 years, 70—79 years, and >80 years) were selected. Therefore, mild, moderate and severe COPD subgroups included the five age strata each. Then, the same number of men than the total number of women in each subgroup was selected at random. Finally, 1661 pairs were obtained.

The Statistical Package for the Social Sciences (SPSS, version 12.0) was used for the analysis of data. Double data entry was carried out with a subsequent validation to guarantee the quality and consistency of the data. Continuous variables are expressed as mean and standard deviation (SD) or median and ranges (25—75th percentiles). Qualitative variables are described as frequency and percentages. Confidence intervals (CIs) were calculated at the 95% level. Differences in HRQL in the subgroups of patients according to gender and severity of COPD were analyzed with the paired Student's *t*-test. The Spearman's rank-order correlation coefficient (ρ) was calculated to assess the relationship between HRQL and FEV_1 and level of dyspnea. The chi-square (χ^2) test was used to assess the differences in health resources utilization among the study groups. Statistical significance was set at $P \leq 0.05$.

Results

Women with COPD

A total of 1786 women with COPD, with a mean ($\pm$ SD) age of 66.5 ± 11.0 years, were included in the *MUVICE* cohort. They accounted for 20.3% of 9405 COPD patients recruited by 1826 general practitioners and 240 pneumologists participating in the study. Sociodemographic and clinical characteristics are shown in Table 1. Salient features were as follows: 62.1% of patients were found in the 60—79-year stratum, 73.5% had a BMI ≥ 25 kg/m^2, 57.3% were never smokers, 26.7% ex-smokers (median of 7 years since smoking cessation), and 16.1% current smokers (median pack-years 30) who had been smoking for a mean of 30 ± 12.3 years. Patients had a long-standing COPD, with a mean time since diagnosis of 9.5 years. With rear to the last spirometric measurement, the mean FEV_1 predicted value was $58.5 \pm 13.9\%$. The severity of COPD was mild or moderate in 89.3% of cases and severe in 10.7%. Half of the patients had a moderate degree of dyspnea (MRC category 2). The severity of COPD increased with age, with 34% of patients aged 40—49 years suffering from moderate or severe COPD as opposed to 66.3% of patients of 80 years or older ($P < 0.0001$). The degree of dyspnea also increased with age, with 4.4% of patients aged 40—49 years in the MRC categories 4 and 5 compared with 30% of patients aged 80 years or older ($P < 0.0001$).

The mean PCS-12 and MCS-12 scores were 36.5 ± 10.3 and 44.1 ± 11.8, respectively. General health and physical functioning domains were those with the lowest scores, whereas role emotional and social functioning domains were those with the highest scores (Table 2). According to the results of the SF-12 questionnaire, HRQL was graded as normal (40—60 points) by 51.3% of patients and as low (<40 points) by 48.7% of patients. However, a higher percentage of patients scored less than 40 points in the physical health domain compared with the mental health domain (62% *vs.* 36.7%) (Table 2). As compared to the reference population, patients with COPD had a reduction of HRQL, with a mean of -1.4 ± 1.1 for PCS-12 and -0.6 ± 1.2 for MCS-12. The percentage of women with low HRQL increased according to age (31.9% for the 40—49-year age group compared with 62.6% for the ≥80-year age group, $P < 0.0001$), whereas the percentage of women with high or normal HRQL decreased significantly (68.1% *vs.* 37.4%, $P < 0.0001$). These differences remained statistically significant for PCS-12 but not for MCS-12 (Fig. 1). Scores for the different domains of PCS-12 and MCS-12 according to age are shown in Table 3.

In relation to COPD severity, PCS-12 was rated lower than the MCS-12, that is, more women rated HRQL as low in the physical component than in the mental component

Table 1 Sociodemographic and clinical data of 1786 women with COPD (*MUVICE* cohort).

Characteristic	Number (%)	Mean ± SD (range)[a]
Age, years ($n = 1727$)		66.5 ± 11.0 (59—75)
Age groups ($n = 1727$)		
40—49 Years	135 (7.8)	
50—59 Years	314 (18.2)	
60—69 Years	529 (30.6)	
70—79 Years	543 (31.4)	
≥80 Years	206 (11.9)	
Height, cm, mean (SD) ($n = 1744$)		159.8 ± 7.3 (155—165)
Weight, kg, mean (SD) ($n = 1722$)		71.0 ± 11.7 (63—78)
Body mass index (BMI) ($n = 1704$)		27.9 ± 4.7 (24.8—30.4)
<25 kg/m^2	452 (26.5)	
25—29 kg/m^2	791 (46.4)	
30—34 kg/m^2	330 (19.4)	
35—39 kg/m^2	102 (5.9)	
≥40 kg/m^2	29 (1.7)	
Smoking ($n = 1769$)		
Never	1013 (57.3)	
Ex-smoker	472 (26.7)	
Current smoker	284 (16.1)	
Pack-years ($n = 216$)		33.8 ± 17.5 (20—45)
Years since COPD diagnosis ($n = 1312$)		9.5 ± 8.1 (4—13)
FEV_1% predicted ($n = 1299$)		58.5 ± 13.9 (49—70)
FEV_1/FVC% ($n = 1000$)		64.4 ± 14.3 (55.5—73)
Severity of COPD ($n = 1719$)		
Mild	754 (43.9)	
Moderate	781 (45.4)	
Severe	184 (10.7)	
MRC dyspnea scale ($n = 1753$)		
1	302 (17.2)	
2	812 (46.3)	
3	398 (22.7)	
4	189 (10.8)	
5	52 (2.9)	

[a] Twenty-fifth to Seventy-fifth percentile.

Table 2 Quality of life in 1786 women with COPD (*MUVICE* cohort).

SF-12 questionnaire	Mean ± SD	No. of patients (%)
Physical component summary (PCS-12)	36.5 ± 10.3	
Mental component summary (MCS-12)	44.1 ± 11.8	
SF-12 scales		
Physical functioning	37.4 ± 31.7	
Role physical	40.1 ± 45.1	
Bodily pain	58.6 ± 29.8	
General health	30.6 ± 19.9	
Vitality	40.7 ± 25.7	
Social functioning	61.8 ± 26.5	
Emotional role	62.0 ± 45.4	
Mental health	58.5 ± 20.5	
Physical domain ($n = 1786$)		
High (>60 points)		4 (0.2)
Normal (40–60 points)		675 (37.8)
Low (<40 points)		1107 (62.0)
Mental domain ($n = 1786$)		
High (>60 points)		73 (4.0)
Normal (40–60 points)		1057 (59.2)
Low (<40 points)		656 (36.7)

(Fig. 2). The mean PCS-12 scores were 41.2 ± 9.6 in patients with mild disease, 33.9 ± 9.4 in those with moderate COPD and 28.5 ± 8.3 in those with severe disease ($P < 0.001$); the corresponding figures for the mean MCS-12 scores were 45.8 ± 11.4, 43.5 ± 11.6 and 39.9 ± 12.6 in the groups of mild, moderate and severe COPDs, respectively ($P < 0.0001$). There were statistically significant differences according to the severity of the disease in the mean scores of all domains of the PCS-12 and MCS-12 scales (Table 3). Moreover, patients with severe COPD showed a significantly higher ($P < 0.0001$) reduction of HRQL for both the physical (−2.3 ± 0.9) and mental domains (−1.1 ± 1.3) than patients with moderate or mild COPD as compared with the reference population.

HRQL correlated significantly with FEV_1 in both PCS-12 ($\rho = 0.327$, $P < 0.0001$) and MCS-12 ($\rho = 0.132$, $P < 0.0001$) scales. As expected, an inverse significant correlation between HRQL and degree of dyspnea in the PCS-12 ($\rho = -0.563$, $P < 0.0001$) and the MCS-12 ($\rho = -0.247$, $P < 0.0001$) scales was observed.

Men and women with COPD matched by age and severity level

In the subset of 1661 patients matched by age and COPD severity, the median age of the patients was 68 years. As shown in Table 4, there were statistically significant differences in anthropometric data and smoking history. In general, women were thinner than men. Grade 1 overweight

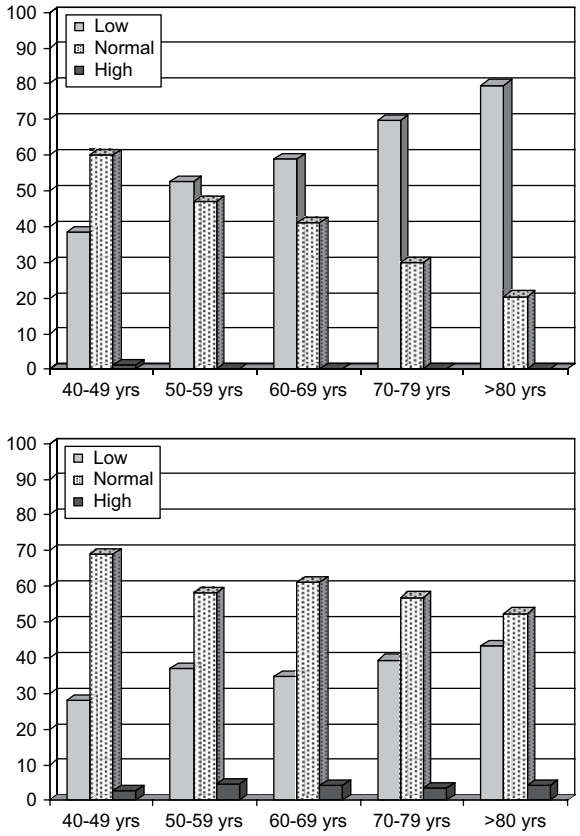

Figure 1 Differences in HRQL according to age. Changes were statistically significant ($P < 0.0001$) for the physical component of the SF-12 (upper panel) but not for the mental component (lower panel).

(BMI 25–29 kg/m^2) was recorded in 46% of women and in 56% of men ($P < 0.0001$). Women had also a significantly worse HRQL than men in all physical and mental domains. A significantly higher percentage of women considered that HRQL was low as compared with men (Fig. 3). The use of health care resources was similar in both the genders (Table 4), although a significantly higher percentage of women visited their family physicians (non-programmed visits) in the previous 12 months than men. The mean length of hospitalization for COPD exacerbation was significantly greater in men (3.5 ± 2.6 days) than in women (2.9 ± 2.4 days) ($P = 0.02$). Differences in other variables were not observed. Smoking cessation counseling and stop smoking treatment were significantly more often received by men. Pulmonary rehabilitation was more frequently used by women than men. The use of different pharmacological treatments was similar in both the genders, although men used bronchodilators and long-acting anticholinergics more frequently than women, and women received oral steroids more often than men (Table 4).

Discussion

This study was conducted to assess the clinical characteristics of COPD and the impact of the disease on HRQL in a large population of Spanish women with COPD during the

Table 3 Differences in HRQL according to age and severity of level in 1786 women with COPD (*MUVICE* cohort).

	Physical component				Mental component			
	Physical functioning	Role physical	Bodily pain	General health	Vitality	Social functioning	Emotional role	Mental health
Age groups, years								
40—49 ($n = 135$)	57.8 (30.9)	58.9 (44.8)	71.5 (26.8)	39.1 (21.9)	50.1 (25.7)	74.1 (21.7)	69.3 (42.8)	63.3 (21.0)
50—59 ($n = 314$)	45.8 (30.3)	45.5 (45.7)	67.7 (27.8)	34.6 (19.1)	45.9 (24.6)	68.7 (24.5)	61.9 (44.8)	60.3 (20.9)
60—69 ($n = 529$)	39.0 (30.2)	42.8 (43.5)	59.7 (27.7)	31.3 (17.9)	42.7 (25.2)	63.5 (24.7)	63.8 (44.8)	59.5 (19.7)
70—79 ($n = 543$)	32.4 (31.3)	34.2 (43.5)	53.6 (30.9)	27.6 (20.0)	37.1 (25.2)	57.6 (27.5)	54.9 (46.4)	56.4 (20.4)
≥80 ($n = 206$)	19.4 (26.7)	28.2 (42.3)	45.1 (28.4)	24.0 (20.3)	30.5 (25.0)	49.4 (27.9)	57.0 (47.2)	56.0 (21.0)
COD severity								
Mild ($n = 754$)	50.9 (30.5)	56.6 (44.9)	68.0 (27.1)	38.6 (19.4)	47.5 (25.6)	70.3 (24.6)	68.8 (43.0)	63.4 (20.5)
Moderate ($n = 781$)	30.8 (28.8)	30.5 (42.2)	52.8 (28.6)	26.6 (17.5)	37.4 (23.7)	57.4 (24.3)	59.5 (46.2)	56.1 (19.0)
Severe ($n = 184$)	10.2 (21.1)	12.0 (29.0)	46.1 (33.8)	14.1 (17.1)	27.5 (26.6)	44.3 (29.9)	46.7 (45.8)	49.4 (22.0)

Data as mean (standard deviation, SD); $P < 0.0001$ for the comparisons across year strata in all domains except for emotional role; $P < 0.0001$ for the comparisons across levels of COPD severity in all domains.

patients' routine care in the outpatient setting. The sample of women was drawn from a previous study (the *VICE* Study) in which data of 9405 patients with COPD were analyzed.[44] The present study describes the clinical profile of COPD in women and adds evidence of gender-related differences in two groups of 1661 men and women with COPD matched by severity of COPD as measured by FEV_1 and age. To our knowledge, this is the largest clinical series of matched men and women with COPD reported up to now. In this respect, our main findings of a worse HRQL for women in all domains of the SF-12 questionnaire as compared with men are consistent with previous studies of de Torres et al.[17,33] using the disease-specific SGRQ instrument.

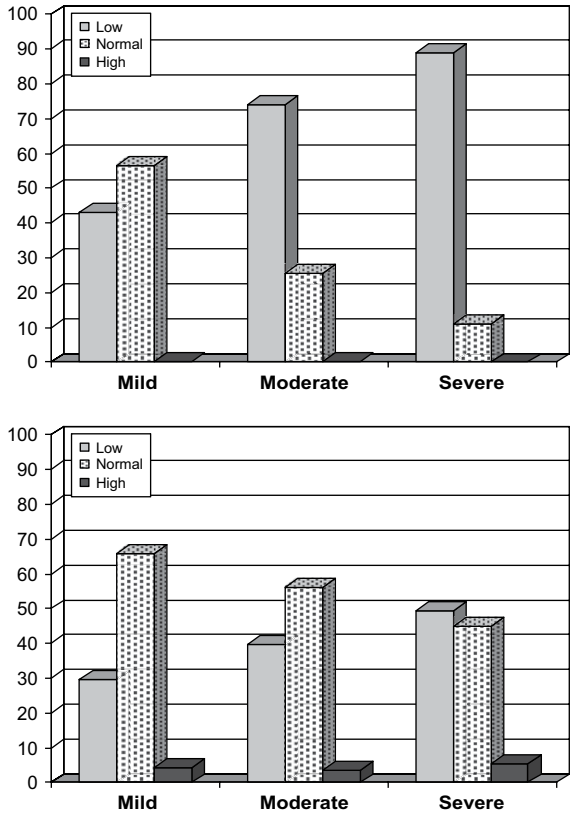

Figure 2 Across all COPD severity stages, more women rated their HRQL as low for the physical component (upper panel) than for the mental component (lower panel).

With regard to anthropometric variables, in our study, like others,[17,45] BMI values in women were lower than in men, suggesting that COPD may affect the nutritional status in a different way, with women appearing more susceptible to the effect of the disease. Men and women showed a mean duration of COPD of 9 years since diagnosis. Other lung function parameters and degree of dyspnea were similar in both the genders. The severity of COPD and the severity of dyspnea increased with age; 66% of women in the youngest age stratum (40—49 years) had mild COPD and, therefore, suitable candidates for effective therapeutic intervention.

Interestingly, the percentage of never smokers among women was very high (57% of cases), whereas only 6% of men never smoked. Other studies have also shown that women smoked less than men,[17,33,46] although differences in the current smoking status were not observed.[33] Non-smoking-related COPD is diagnosed in 5—12% of patients, and most frequently in women.[13] Moreover, there may also be underdiagnosis and misdiagnosis of COPD in both the sexes because objective measures of lung function are underused.[9,44] In our study, different reasons may account for the high number of women with COPD who never smoked, including the effect of passive smoking and COPD misdiagnosis. On the other hand, patients with long-standing asthma may develop chronic airflow obstruction showing spirometric lung function measurements suggestive of COPD. As has been reported, having asthma increases 17 times the risk of receiving a diagnosis of emphysema and 12.5 times the risk of fulfilling COPD criteria.[47] We also found that 26% of men and 16% of women continued smoking. Although these percentages are lower than the percentage of current smokers of 35% both in men and women reported in a previous cross-sectional survey of 11,973 outpatients with COPD carried out in Spain,[48] efforts

Table 4 Differences in the clinical characteristics, HRQL, health care resources utilization and treatment between men and women matched by age and COPD severity.

Characteristic	Men ($n = 1635$)	Women ($n = 1640$)	P value
Height, cm	168.0 ± 7.0	159.8 ± 7.4	<0.0001
Weight, kg	77.6 ± 11.4	70.9 ± 11.8	<0.0001
Body mass index (BMI), kg/m^2	27.5 ± 3.7	27.9 ± 4.7	0.021
Smoking, no. of patients (%)			<0.0001
Never	101 (6.1)	942 (57.2%)	
Ex-smoker	1123 (67.9)	442 (26.8)	
Current smoker	431 (26.0)	264 (16.0)	
Pack-years	38.6 ± 17.9	33.9 ± 17.6	0.003
Duration of smoking, years	35.6 ± 13.9	29.9 ± 12.1	0.003
Years since smoking cessation	10.6 ± 8.3	8.3 ± 7.1	0.020
Years since COPD diagnosis	9.2 ± 7.5	9.1 ± 8.1	0.956
FEV_1% predicted	57.9 ± 13.5	58.4 ± 14.0	0.603
FEV_1/FVC%	63.0 ± 14.1	64.4 ± 14.3	0.283
MRC dyspnea scale, no. of patients (%)			0.061
1	297 (18.2)	289 (17.7)	
2	769 (47.0)	748 (45.9)	
3	403 (24.6)	370 (22.7)	
4	132 (8.0)	171 (10.5)	
5	34 (2.0)	51 (3.1)	
Health-related quality of life (SF-12)			
Total score	43.5 ± 7.6	40.3 ± 8.1	<0.0001
Physical component summary (PCS-12)	38.3 ± 10.4	36.5 ± 10.4	<0.0001
Physical functioning	43.7 ± 32.4	37.3 ± 31.7	<0.0001
Role physical	50.7 ± 46.3	40.0 ± 45.0	<0.0001
Bodily pain	68.1 ± 27.8	58.6 ± 29.7	<0.0001
General health	33.6 ± 19.2	30.4 ± 19.9	<0.0001
Mental component summary (MCS-12)	48.7 ± 10.3	44.1 ± 11.8	<0.0001
Vitality	47.0 ± 26.8	40.6 ± 25.7	<0.0001
Emotional role	78.4 ± 38.3	61.9 ± 45.4	<0.0001
Mental health	66.1 ± 19.6	58.6 ± 20.5	<0.0001
Use of health care resources, no. of patients (%)			
Non-programmed visits to the family physician	1085 (65.3)	1168 (70.3)	0.002
Non-programmed visits to the pneumologist	576 (34.7)	604 (36.4)	0.304
Emergency department consultations	644 (38.8)	681 (41.0)	0.178
Hospital admissions	343 (20.7)	324 (19.5)	0.388
Sick leave	157 (9.4)	145 (8.7)	0.442
Non-pharmacological treatment, no. of patients (%)	810 (48.8)	719 (43.3)	0.003
Smoking cessation counseling	462 (27.8)	271 (16.3)	<0.0001
Stop smoking treatment	79 (4.7)	43 (2.5)	0.0009
Oxygen therapy	116 (6.9)	111 (6.6)	0.717
Rehabilitation	139 (8.3)	190 (11.4)	0.002
Pharmacologic treatment, no. of patients (%)	1400 (84.3)	1393 (83.9)	0.742
Bronchodilators	1221 (73.5)	1164 (70.1)	0.028
Short-acting β_2 agonists	437 (26.3)	430 (25.9)	0.790
Long-acting β_2 agonists	369 (22.2)	356 (21.4)	0.587

(*continued on next page*)

Table 4 (*continued*)

Characteristic	Men ($n = 1635$)	Women ($n = 1640$)	*P* value
Short-acting anticholinergics	245 (14.8)	265 (16.0)	0.332
Long-acting anticholinergics	713 (42.9)	615 (37.0)	0.0006
Theophylline	316 (19.0)	319 (19.2)	0.894
Fixed combinations	949 (57.1)	961 (57.9)	0.675
Oral steroids	95 (5.7)	147 (8.8)	0.0005
Inhaled steroids	273 (16.4)	249 (15.0)	0.242

Data as mean ± standard deviation unless otherwise stated.

at preventing the initiation of tobacco smoking and interventions directed to quit smoking seem to be of utmost importance. Targeting smoking cessation programs in women with COPD is necessary, not only because it has been shown that women who smoke had greater difficulty quitting than men,[13,14] but also because smoking cessation counseling and stop smoking treatment are significantly more frequently offered to men than to their female counterparts, as shown in our study.

The main objective of the study was to characterize HRQL in women with COPD and to assess whether the disease had a different impact on HRQL according to the gender. A total of 48.7% of women considered that their HRQL was low (62% for the physical component and 36.7% for the mental component). In general, the physical health domain was rated poorly than the mental health domain, with physical functioning, general health, and role physical showing the lower scores. Lower scores for the PCS-12 component than for the MCS-12 component in patients with COPD have also been reported in other studies.[30,32] Significant differences in HRQL according to age and COPD severity were also observed, confirming the effect of age and stage of disease on HRQL in patients with COPD. It has been shown that COPD is the main cause of deterioration of quality of life in elderly subjects and that the degree of this impairment strongly depends on the decrease in FEV_1.[29] The present findings, however, should be interpreted taking into account that the influences of other factors, such as socioeconomic status, education level, working status, or underlying comorbid diseases were not evaluated. However, given that a large majority of women had mild to moderate COPD, the observation of low scores in almost all domains of the SF-12 questionnaire is clinically relevant, suggesting that women with COPD may develop symptoms influencing HRQL in the presence of relatively small degrees of airway obstruction.

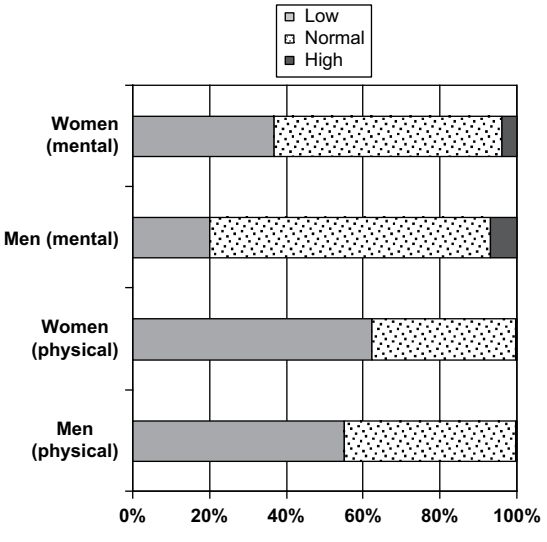

Figure 3 A higher percentage of women considered that HRQL was low as compared with men for both the physical and the mental components of the SF-12.

An interesting aspect of the study was the comparison of HRQL among pairs of men and women with COPD matched by age and severity of disease as measured by the FEV_1. Compared with men, women had significantly lower scores in the total score of the SF-12 questionnaire as well as in all physical and mental domains. Our results are in agreement with those previously reported by de Torres and colleagues[17,33] in two matched case series studies. In the study of Antonelli-Incalzi et al.[49] in which differences in health status according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria were evaluated, females had greater susceptibility to the negative effects of COPD on HRQL measured by the SGRQ and generic indexes of health status.

In relation to the utilization of health care resources, the only statistically significant difference between men and women was a higher percentage of women requesting non-programmed visits to their general practitioner. As previously mentioned, non-pharmacological treatment was more frequently used in men than in women, particularly smoking cessation counseling and treatment to quit smoking. Pulmonary rehabilitation, however, was more often used by women. Differences in pharmacological treatment for COPD were only significant for bronchodilators and long-acting anticholinergics, which were more frequently used by men, and for oral steroids, which were used more often by women.

In the present study COPD was defined as a ratio of $FEV_1/FVC < 0.7$ after bronchodilation. It is possible that the number of elderly patients (above 60 years) with COPD may be overestimated.[50] On the other hand, the present results should be interpreted taking into account some limitations of the study. Firstly, a generic questionnaire was used to measure HRQL, which is less sensitive than the specific tools (e.g., SGRQ), although the SF-12 instrument contains only 12 items and is easy to administer in ambulatory patients with COPD who were mostly attended in primary care centers. Secondly, the cross-sectional design of the

study limits the ability to describe trends and changes in HRQL in relation to progression of the disease. However, data recorded were obtained in a non-trial setting, which enhances the external validity of the study. Thirdly, a high percentage of women were never smokers. These patients were not excluded because the objective of the study was to analyze HRQL in outpatients with COPD who were attended by general practitioners and pneumologists in the real world setting. Nevertheless, a diagnosis other than COPD cannot be definitively excluded. Finally, other factors that may affect HRQL (e.g., socioeconomic status, education, comorbidities) were not assessed. In contrast, the large sample size of both the cohort of women and the pairs of men and women matched by age and COPD severity strengthens the findings of the present survey.

We conclude that in the present population of women with COPD who were attended in the outpatient setting in daily practice conditions, HRQL was impaired especially the physical component of the SF-12 instrument. Moreover, for the same age and severity of COPD, women showed significantly lower scores in all domains of the SF-12 than men. According to these results more attention should be given to the deleterious effect of chronic airway obstruction on HRQL in women with COPD even in those with mild stages of the disease.

Conflict of interest

E. Antón and A. Martín are employed by Pfizer, Madrid, Spain. J.M. Rodríguez-González Moro, J.L. Izquierdo, and P. de Lucas have no conflicts of interest.

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